Chapter 9: Hazardous Materials

A. INTRODUCTION

This attachment presents the findings of the hazardous materials assessment and identifies potential areas of concern that could pose a hazard to workers, the community, and/or the environment during or after construction of the Kingsbridge Armory Redevelopment ("Proposed Project"). The Project Site includes the Armory Site at 1 West Kingsbridge Road (Block 3247, Lot 10) and the National Guard Site at 10 West 195th Street (Block 3247, Lot 2) (collectively, the "Project Site").

As described in Chapter 1, "Project Description," the Proposed Project includes the adaptive reuse of the vacant Armory with up to approximately 730,226 gross square feet (gsf) of new uses, including a mix of new commercial, community facility, and light industrial uses and the redevelopment of the National Guard Site with a new residential building (up to approximately 497,000 gsf) containing 500 new permanently affordable dwelling units (DUs).

This hazardous materials assessment is based on the findings of the Phase I Environmental Site Assessment (ESA) of the Project Site, prepared by AKRF Inc. (February 28, 2025) in conformance with ASTM Standard E1527-21 *Standard Practice for Environmental Site Assessments: Phase I Environmental Site Assessment Process* and the requirements of ASTM Standard E2600-15 *Standard Guide for Vapor Encroachment Screening on Property Involved in Real Estate Transactions* (see **Appendix C**). AKRF's Phase I ESA included an evaluation of findings from prior environmental assessments and investigations conducted at the Project Site, which are referenced below:

- *Phase I Environmental Site Assessment*, Metcalf & Eddy | AECOM, August 2006;
- *Phase II Environmental Site Assessment Report, Kingsbridge Armory*, TRC Environmental Corporation, September 19, 2007;
- *Phase II Environmental Site Investigation (ESI) Report, Kingsbridge Armory—29 West Kingsbridge Road*, Langan Engineering & Environmental Services, P.C., Draft November 6, 2008;
- *Supplemental Groundwater Investigation Report, Kingsbridge Armory*, Langan Engineering & Environmental Services, P.C., June 17, 2009;
- *Phase I Environmental Site Assessment, Kingsbridge Armory—29 West Kingsbridge Road*, AECOM, October 2013;
- *Phase II Supplemental Environmental Site Investigation Report*, Langan Engineering & Environmental Services, P.C., June 7, 2013;

- *Soil Sampling Results of Kingsbridge Armory*, GZA GeoEnvironmental of New York, January 12, 2016; and
- *Phase I ESA, Kingsbridge Armory Redevelopment, Bronx, New York*, AKRF, Inc., February 28, 2025.

AKRF's Phase I ESA also summarized the findings of the following previous hazardous materials surveys to identify the presence of lead, asbestos-containing materials (ACMs), and/or polychlorinated biphenyls (PCBs), and lead-based paint (LBP) at the Project Site:

- *Kingsbridge Armory Roof Rehabilitation Project Environmental Survey Report* (ET Environmental Corporation, September 15, 2000);
- *Asbestos Investigation, Kingsbridge Armory* (Langan Engineering & Environmental Services, P.C., October 6, 2008);
- *Limited Hazardous Materials Investigation Report* (GZA GeoEnvironmental of New York, December 21, 2015);
- *Results of the Supplemental Asbestos-Containing Material Survey, Kingsbridge Armory, 29 West Kingsbridge Road, Bronx, New York* (GZA GeoEnvironmental of New York, January 5, 2016); and
- *Asbestos and Lead Paint Survey Report* (TRC Environmental Corporation, June 6, 2023).

B. PRINCIPAL CONCLUSIONS

The Proposed Project would entail limited ground disturbance on the Armory Site, and the demolition of the National Guard buildings and redevelopment of the National Guard Site. To avoid any potential for hazardous materials exposure on the Project Site, all federal, state, and local requirements and regulations would be followed, as well as the following:

- Based on the contamination present (identified by prior investigations on the Project Site, references for which were provided in the 2025 Phase I ESA), an (E) Designation for hazardous materials (E-850) will be placed on the Project Site (Block 3247, Lots 2 and 10).
- Additional ACM testing of materials to be disturbed by renovations, as warranted. Prior to demolition, an ACM survey within the National Guard and Armory buildings, and other previously untested structures would be conducted. Any identified ACM would be removed prior to the renovation or demolition activities at the Project Site.
- Performing any demolition activities with the potential to disturb lead-based paint (LBP) materials in accordance with the applicable regulatory requirements.
- Disposing of affected suspect mercury-containing or suspect PCB-containing equipment affected by the Proposed Project in accordance with applicable regulatory requirements. Additional PCB sampling may be necessary in the Armory and National Guard buildings for identification and delineation purposes.
- Removing and properly disposing of soil, debris, and/or dust containing elevated lead levels from the rifle and pistol ranges on the Armory Site in accordance with

applicable regulations. Additional sampling/surveying may be warranted to quantify affected areas/materials.

- Removing and properly disposing of known petroleum tanks and 55-gallon drums in accordance with applicable regulations. This may require testing for handling and disposal purposes of any of the tank and drum contents. If any unforeseen aboveground or underground storage tanks (ASTs/USTs) are encountered, removing the tanks and any associated contamination in accordance with New York State Department of Environmental Conservation (NYSDEC) regulations.
- Evaluating all deteriorating mechanical equipment in the Armory building and mechanical equipment in the National Guard Site slated for demolition/removal to determine if they contain any fluids, including petroleum and/or hazardous substances, and properly disposing of them.
- Transporting material leaving the Project Site for off-site disposal in accordance with all applicable requirements covering licensing of haulers and trucks, placarding, truck routes, manifesting, etc.
- If dewatering activities are required, conducting them in accordance with local requirements for discharge to sanitary/combined sewers. Pretreatment would be performed as necessary to meet the DEP requirements.

With the implementation of these procedures, no significant adverse impacts related to hazardous materials would result from the Proposed Project.

C. EXISTING CONDITIONS

TOPOGRAPHY AND SUBSURFACE CONDITIONS

Based on the United States Geological Survey (USGS), Central Park, New York 2019 Quadrangle map, the Project Site is approximately 135 feet above the North American Vertical Datum (NAVD) of 1988 (an approximation of mean sea level). Topography at the Project Site was relatively level, with a slight downward slope to the southeast.

The findings of Langan's June *2013 Phase II Supplemental Environmental Site Investigation Report* indicates that the depth to groundwater ranged from 11.6 feet along the northern exterior of the Armory building to 30.4 feet in the parking area on the Armory Site near Reservoir Avenue. The depth to groundwater measurements from beneath the building ranged from 3.0 feet on the northwestern portion of the sub-cellar to 10.4 feet on the southwestern portion of the sub-cellar.

Groundwater elevation data indicates that groundwater at the Armory Site flows towards the southwest, which generally conforms to the south-southwest sloping topographic gradient of the surrounding area shown on the USGS Central Park, New York 2019 Topographic Quadrangle Map. However, actual groundwater depth and flow direction may be influenced by other factors, including past pumping and/or subsurface obstructions such as building foundations, subway tunnels, and other utilities. Groundwater in the Bronx is not used as a source of drinking water.

SUMMARY OF AKRF'S PHASE I ESA FINDINGS

PHASE I ESA, KINGSBRIDGE ARMORY REDEVELOPMENT, BRONX, NEW YORK, AKRF—FEBRUARY 28, 2025

AKRF's Phase I ESA included an analysis of the prior assessments and investigations conducted for the Project Site noted in Section A. The following Recognized Environmental Conditions (RECs)/Vapor Encroachment Conditions (VECs) and *de minimis* conditions were identified:

- Two unlisted 275-gallon above-ground storage tanks (ASTs) were observed on the Armory's basement level. Both tanks may have previously contained fuel but appeared to be empty at the time of reconnaissance. One tank was standing on its end, and one tank was tipped on its side. Staining was observed on the concrete floor under one of the tanks.
- Several 55-gallon drums observed at the Project Site were unlabeled and were either empty or filled with unknown substances. Some of the drums exhibited signs of corrosion and, in one case, evidence of a small release.
- Elevated levels of lead from spent munitions were detected during previous investigations in the two rifle ranges and four pistol ranges in the Armory basement. Waste classification samples were determined to contain leachable lead at concentrations exceeding the hazardous waste criteria for lead.
- Resource Conservation and Recovery Act (RCRA) hazardous waste generating activities were identified on the Project Site. The Armory was identified as a generator of hazardous waste several times between 1985 and 2012, including as a non-generator of lead in 2012.
- The Project Site is listed in the NY MANIFEST database for the shipment of 4,195 pounds and 923 gallons of ignitable waste and 2,195 pounds of spent halogenated solvents.
- Sump pits were observed in the southeast portion of the Armory building basement and on the National Guard Site in the east building basement boiler room and on the ground level of the west building. In addition, floor drains (possibly dry wells) were observed in the east National Guard building basement. The sumps and possible dry wells have the potential to have affected the Project Site subsurface.
- Adjacent and nearby properties were identified in the regulatory databases, historical Sanborn maps, City Directory listings, and during site reconnaissance with some potential to affect the Project Site subsurface, including former and/or current automotive-related and commercial facilities, and dry cleaners.
- The National Guard Site was listed in the Petroleum Bulk Storage (PBS) database with the five closed/removed fuel oil and gasoline underground storage tanks (USTs) and two diesel aboveground storage tanks (ASTs) (PBS Facility ID: 2-392014. Two abandoned USTs were discovered in the western parking lot on the National Guard Site during the 2007 Phase II ESA undertaken by TRC, which were suspected to be two of the tanks registered as closed/removed. It is possible other tanks were not closed and/or removed properly, potentially affecting the Project Site subsurface.

- The Project Site was listed in the NYS Spills Information Database (NY SPILLS) and Leaking Underground Storage Tanks (LTANKs) database with the four closed-status spills
- Based on the age of the Project Site buildings and observations during reconnaissance, as well as findings of previous hazardous materials surveys, ACMs, PCBs, and LBPs are present within building material, debris, and/or in buried fill materials at the Project Site.
- Petroleum-containing equipment, including an elevator hydraulic oil reservoir tank and a generator with an associated 5-gallon fuel tank, were observed in the Armory; no evidence of leaks was observed near the generator or its fuel tank. In addition, deteriorating mechanical equipment at the Armory building may contain residual fluids, such as petroleum-based fluids or fluids containing hazardous materials.
- Extensive water damage was observed throughout the Armory building.
- Animal/bird carcasses and excreta were present in much of the mezzanine and second levels of the Armory headhouse.
- Small containers of paint, cleaning supplies, and gasoline associated with building maintenance and groundskeeping activities were present at the Project Site.
- Approximately 100 five-gallon buckets of graffiti remover and paint were observed in storage room S4 in the southwest portion of the Armory building basement mezzanine.
- Various 55-gallon drums were observed in the eastern portion of the Armory's basement garage were labelled as non-hazardous purged groundwater from a previous subsurface investigation and did not show any obvious signs of leakage or breeching.

Provided below are the summaries of prior analyses and investigations that were referenced in AKRF's Phase I ESA:

2007 PHASE II ESA FINDINGS

PHASE II ENVIRONMENTAL SITE ASSESSMENT REPORT, KINGSBRIDGE ARMORY (TRC ENVIRONMENTAL CORPORATION, SEPTEMBER 19, 2007)

The 2007 Phase II ESA prepared by TRC was conducted to investigate RECs for the Armory Site identified in the 2006 Metcalf & Eddy | AECOM Phase I ESA report. The report summarized results of a geophysical survey conducted in August 2000, and TRC coordinated a follow-up geophysical survey during the Phase II ESA, which found no evidence of buried metal near the location of a 12-foot by 15-foot saw-cut area but noted a near-by fill pipe labeled with the word "Gasoline."

The investigation confirmed the presence of the three ASTs and stated that the AST on the drill hall floor still contained diesel fuel for an emergency generator that was no longer operable. TRC's subsurface investigation included excavation of three test pits, advancement of 13 soil borings, and installation of four groundwater monitoring wells along the western portion of the property near the potential USTs. In addition, 18 soil

samples were collected from the upper 1.5-foot depth interval in the pistol and rifle ranges. TRC reported the following findings:

Test Pits near Maintenance Building: Test pit excavations confirmed two abandoned USTs west of the maintenance building. The tanks appeared to have been cut open and filled with sand and gravel. The report noted that the tanks were likely a 3,000-gallon diesel and a 2,000-gallon gasoline USTs that were reportedly closed in September 1993.

Soil Samples West of the Armory Building: Slightly elevated organic vapor concentrations were detected in two borings advanced on the northwest portion of the property west of the maintenance building near the former USTs. Semi-volatile organic compounds (SVOCs) and metals (beryllium, chromium, copper, iron, nickel, and zinc) were detected at concentrations above applicable standards in multiple soil samples collected from the western portion of the Site.

Groundwater Samples West of the Armory Building: Hexachlorobutadiene was detected at a concentration above the NYSDEC drinking water standards in a groundwater sample collected from the well located adjacent to the former gasoline UST near the western exterior of the Armory. TRC noted that hexachlorobutadiene does not occur naturally in the environment and is formed during the processing of other chlorinated compounds. Several metals (iron, magnesium, manganese, and sodium) were also detected at concentrations that exceeded standards in each groundwater sample. TRC concluded that the metals are naturally occurring; therefore, the detections were likely attributable to background soil and/or bedrock conditions in the area.

PHASE II ESI REPORT, KINGSBRIDGE ARMORY—29 WEST KINGSBRIDGE ROAD (LANGAN ENGINEERING & ENVIRONMENTAL SERVICES, P.C., DRAFT NOVEMBER 6, 2008)

The 2008 Phase II ESI prepared by Langan was conducted to assess environmental remediation costs associated with proposed Armory property development, including those associated with the lead contamination in the former pistol and rifle ranges, historic fill material below the basement and western parking area, and former USTs in the western parking area and off-site maintenance area (at the National Guard Site) northwest of the Armory. The investigation consisted of: a geophysical survey in the western exterior parking area; 17 soil borings from which 23 soil samples were collected in the western parking area, basement, and pistol and rifle ranges; 10 test pits from which 10 soil samples were collected in the basement; and monitoring wells from which three groundwater samples were collected in the basement.

The geophysical survey did not identify obvious indications of USTs. Soil underlying the Armory Site was found to consist of historic fill comprised of sand with traces of silt, gravel, brick, and ash. The fill generally extended to depths of 4 to 7 feet below the cellar floor slab and to approximately 20 to 25 feet below ground surface (bgs) in the western parking area. Weathered rock was encountered from 12 to 15 feet below the sub-cellar floor slab. Groundwater was encountered in the monitoring wells at depths of approximately 4 to 7 feet below the sub-cellar floor slab.

Elevated organic vapor concentrations, stained soil, and petroleum odors were observed in two test pits and one boring in the northwest portion of the sub-cellar. Impacted soil was observed at depths of between 2 and 12 feet below the floor slab, and a petroleum

odor and an elevated organic vapor reading were detected in soil collected from the 25 to 30 feet depth interval in one boring in the western parking area. In general, soil samples exhibited concentrations of SVOCs and metals typical of historic urban fill and did not indicate a spill at the Site. Six of the 17 soil samples collected from the pistol and rifle ranges exhibited Toxicity Characteristic Leaching Procedure (TCLP) lead concentrations indicative of hazardous waste. Elevated concentrations or organic compounds were also detected in a few groundwater samples.

The report concluded that groundwater under the northwestern portion of the sub-cellar had been impacted with petroleum. Additional groundwater sampling on the National Guard Site was recommended to determine whether the two historical USTs on the National Guard Site were the source of the impacts.

2009 SUPPLEMENTAL GROUNDWATER INVESTIGATION REPORT, KINGSBRIDGE ARMORY (LANGAN ENGINEERING & ENVIRONMENTAL SERVICES, P.C., JUNE 17, 2009)

Langan conducted a groundwater investigation via the installation of monitoring wells on the National Guard and Armory Sites to evaluate the source of groundwater impacts in the northwestern portion of the basement in the Armory building. The field observations and analytical results did not indicate the presence of a spill on the National Guard Site associated with decommissioned on-site USTs or other conditions.

2013 PHASE II SUPPLEMENTAL ENVIRONMENTAL SITE INVESTIGATION REPORT (LANGAN ENGINEERING & ENVIRONMENTAL SERVICES, P.C., JUNE 7, 2013)

Langan completed a supplemental site investigation at the Armory Site in May 2013 that included: a geophysical survey; installation of five subsurface soil vapor points and collection of five soil gas samples and one ambient air sample; collection of 18 soil samples from nine environmental borings to depths ranging between 8 to 35 feet below grade surface; and installation and sampling of five temporary groundwater monitoring wells and sampling of two existing permanent monitoring wells.

Several VOCs, SVOCs, and metals were detected in soil samples above applicable standards. VOCs, SVOCs, and metals were also detected above drinking water standards, though the groundwater is not used as a potable source. Several VOCs were detected in the soil vapor samples at concentrations that exceeded background concentrations established in New York State Department of Health's (NYSDOH's) October 2006 *Guidance for Evaluating Soil Vapor Intrusion in the State of New York*.

2016 SOIL SAMPLING RESULTS OF KINGSBRIDGE ARMORY (GZA GEOENVIRONMENTAL OF NEW YORK, JANUARY 12, 2016)

GZA GeoEnvironmental (GZA) collected soil samples from five test pit locations within the Armory building on December 17, 2015, to characterize excavated material for disposal.

Soil samples were collected from the top 2 feet of soil below the existing basement slab elevation. Analytical results indicated that several organic compounds exceeded their respective in one soil sample. Several metals, including chromium, copper, lead, mercury, and zinc were detected at elevated concentrations. However, analysis for

RCRA characteristics (ignitability, corrosivity, and reactivity) and chemical analysis of the other samples indicated that material from these areas could be considered non-hazardous waste.

HAZARDOUS MATERIALS SURVEY FINDINGS

Based on the findings of the previous hazardous materials surveys identified in Section A, "Introduction" above, ACM, PCBs, and lead-based paint (LBP) are present within building material, debris, and/or in buried fill materials at the Project Site, as follows:

- ACM was identified in building components throughout the Armory, including in pipe and pipe fitting/joint insulation, wire wrap insulation, debris, roofing and flashing materials, flooring materials, plaster walls and ceilings, cove base and adhesive, wall panel glue, mirror glue, window glazing, exterior and interior caulking, façade mastic, duct vibration cloth, tank mastic, an electric transite switch panel, tank mastics, and exterior joint, seam, and crack fill materials. ACM was observed to be in poor condition throughout the Armory building.
- Suspect PCBs were identified in Armory building components based on visual inspection, and the presence of PCBs in lighting ballasts, lighting fixtures, and caulking, was confirmed based on a review of product labels and/or laboratory analysis of collected samples. In addition, hazardous levels of PCBs were detected in one caulking sample collected by GZA as part of their *Limited Hazardous Materials Investigation Report*, dated December 2015.
- LBP was identified on a variety of Armory building components and it was recommended that all painted surfaces at the Armory building be considered LBP. In addition, as documented in the August 2000 *Environmental Survey Report* by ATC, leachable lead was detected above 5 parts per million (ppm) in samples collected from the earthen floors of the rifle and pistol ranges in the Armory basement, indicating that these materials are hazardous lead-containing solid waste.

D. THE FUTURE WITHOUT THE PROPOSED PROJECT

In the Future Without the Proposed Project (the No Action condition), the Armory would remain vacant and substantially underutilized and the National Guard buildings on the National Guard Site would remain in use by the National Guard. The adaptive reuse of the Armory would not be implemented, the buildings on the National Guard Site would not be demolished, and the National Guard Site would not be redeveloped.

E. THE FUTURE WITH THE PROPOSED PROJECT

In the future with the Proposed Project, the Armory would be adaptively reused with a mix of new commercial, community facility, and light industrial uses with limited ground disturbance on the Armory Site. The National Guard buildings would be demolished and the National Guard Site redeveloped with a new residential building containing up to 500 new permanently affordable DUs.

The potential for significant adverse impacts would be avoided by following the requirements:

Based on the contamination present (identified by prior investigations on the Project Site, references for which were provided in AKRF's Phase I ESA) an (E) Designation for hazardous materials (E-850) will be placed on the Project Site (Block 3247, Lots 2 and 10).

The requirements for hazardous materials under E-850 are as follows:

TASK 1—SAMPLING PROTOCOL

The applicant submits to OER, for review and approval a Phase I of the site along with a solid, groundwater and soil vapor testing protocol, including a description of methods and a site map with all sampling locations clearly and precisely represented. If sampling is necessary, no sampling should begin until written approval of a protocol is received from OER. The number and location of samples should be selected to adequately characterize the site, specific sources of suspected contamination (i.e., petroleum-based contamination and non-petroleum-based contamination), and the reminder of the site's condition. The characterization should be complete enough to determine what remediation strategy (if any) is necessary after review of sampling data. Guidelines and criteria for selecting sampling locations and collecting samples are provided by OER upon request.

TASK 2—REMEDIATION DETERMINATION AND PROTOCOL

A written report with findings and a summary of the data must be submitted to OER after completion of the testing phase and laboratory analysis for review and approval. After receiving such results, a determination is made by OER if the results indicate that remediation is necessary. If OER determines that no remediation is necessary, written notice shall be given by OER.

If remediation is indicated from test results, a proposed remediation plan must be submitted to OER for review and approval. The applicant must complete such remediation as determined necessary by OER. The applicant should then provide proper documentation that the work has been satisfactorily completed.

A constructed-related health and safety plan should be submitted to OER and would be implemented during excavation and construction activities to protect workers and the community from potentially significant adverse impacts associated with contaminated soil, groundwater and/or soil vapor. This plan would be submitted to OER prior to implementation.

With this (E) designation in place, no significant adverse impacts related to hazardous materials would occur.

Additional measures would include the following:

- Additional ACM testing of materials to be disturbed by renovations, as warranted. Prior to demolition, an ACM survey within the National Guard and Armory buildings, and other previously untested structures would be conducted. Any identified ACM would be removed prior to the renovation or demolition activities at the Project Site.
- Performing any demolition activities with the potential to disturb lead-based paint (LBP) materials in accordance with the applicable regulatory requirements.

- Disposing of affected suspect mercury-containing or suspect PCB-containing equipment affected by the Proposed Project in accordance with applicable regulatory requirements. Additional PCB sampling may be necessary in the Armory and National Guard buildings for identification and delineation purposes.
- Removing and properly disposing of soil, debris, and/or dust containing elevated lead levels from the rifle and pistol ranges on the Armory Site in accordance with applicable regulations. Additional sampling/surveying may be warranted to quantify affected areas/materials.
- Removing and properly disposing of known petroleum tanks and 55-gallon drums in accordance with applicable regulations. This may require testing for handling and disposal purposes of any of the tank and drum contents. If any unforeseen aboveground or underground storage tanks (ASTs/USTs) are encountered, removing the tanks and any associated contamination in accordance with NYSDEC regulations.
- Evaluating all deteriorating mechanical equipment in the Armory building and mechanical equipment on the National Guard Site slated for demolition/removal to determine if they contain any fluids, including petroleum and/or hazardous substances, and properly disposing of them.
- Transporting material leaving the Project Site for off-site disposal in accordance with all applicable requirements covering licensing of haulers and trucks, placarding, truck routes, manifesting, etc.
- If dewatering activities are required, conducting them in accordance with local requirements for discharge to sanitary/combined sewers. Pretreatment would be performed as necessary to meet DEP requirements.

With the placement of E-850 and the implementation of the procedures described above, no significant adverse impacts related to hazardous materials would result from the Proposed Project. ✴